# Clicking synthetic and biological molecules together

February 19 2008

Dutch researcher Joost Opsteen has developed a method to click polymers together in a controlled manner. Using this method, he can even attach proteins to nanoballs. For instance, this approach could be used to transport medicines in the body.

Over the past few years there has been an increasing interest in combining biopolymers, such as proteins and DNA, and synthetic polymers to create new biohybrid macromolecules. These hybrid polymers can be used in medicines, bioengineering and nanotechnology.

One of the difficulties in combining synthetic and biological polymers is that biopolymers contain a lot of functional groups, which must also retain their functionality after coupling has taken place. Consequently, chemical reactions need to be developed that are not only efficient but also highly selective about where the polymers join.

Joost Opsteen used a known coupling reaction: a reaction between azides and alkynes, with copper as the catalyst. This reaction is also referred to as “click” chemistry. Based on this reaction, he developed a method to link polymers together in a controlled manner. He attached the required azide and alkyne groups onto the ends of polymer chains. Subsequently, using copper as the catalyst he joined the synthetic polymers to each other and to the proteins.

Some polymers form nanoballs in water, a property that may be used to transport medicines in the body. Using click chemistry, proteins can be

attached to these nanoballs. With this approach the nanoballs could be transported to the correct location in the body.

Source: NWO